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| **Lesson Title: Area and Perimeter of Rectangles** |
| **Subject area / course / grade level: Math 4th Grade** |
| **Introduction:** This lesson is designed to focus on a major content topic in the measurement curriculum – understanding how perimeter and area are calculated. This is an introductory lesson that is a stepping stone to recognizing how the formulas for perimeter, area, surface area, and volume for other 2D and 3D shapes are derived. |
| **Lesson Length: 50 min** |
| **Materials: Geoboards and bands, perimeter and area handout, rulers, calculators, BrainPop “Geometery: That’s One Way to Measure Space”** |
| **Lesson Overview:**  Participants will use inductive reasoning (via working through multiple examples) to derive the perimeter and area formulas for rectangles. |
| **Tennessee Standards:**  GLE 0406.4.2 Understand and use measures of length, area, capacity, and weight.  0406.4.8 Recognize that a measure of area represents the total number of same-sized units /that cover the shape without gaps or overlaps.  0406.4.9 Recognize that area does not change when 2-dimensional figures are cut apart and rearranged.  0406.4.10 Connect area measure to multiplication using a rectangular area model.  SPI 0406.4.9 Solve problems involving area and/or perimeter of rectangular figures. |
| **Lesson objective(s):**  **TLW:** Develop and apply content knowledge of how perimeter formulas are derived for common 2-D shapes.  Develop and apply content knowledge of how area formulas are derived for common 2-D  shapes. |
| **ENGAGEMENT**  **Activity:**  Facilitator will pose this scavenger hunt/scenario to the group:  *“You have 1-2 minutes to gather several items from your backpacks, cubbies, or desks that are rectangular in shape. Briefly share your findings with your shoulder partner. Select one item to tell how you would determine the perimeter or area of the item. Each person should have at least one turn.”*    **Questions:**  1. What observations did you make as you gathered items?  2. What terms/vocabulary did you use to describe the measurement?  3. To what extent did you incorporate measurement formulas?  4. How do similar measurements of different items compare to each other? |
| **EXPLORATION**  **Deriving Perimeter and Area formulas for common 2-D shapes**   * Use rulers to measure length and width of items so that they may be recreated on the geoboards. * As per formula for perimeter, make the square and rectangle on the geoboard; observe perimeter measurement patterns and derive the formulas based on pattern observations (**P=4*s*** for square; **P=2*l* + 2*w*** for rectangle). * Use additional bands to divide the rectangles into same sized units to represent area and derive area formula (**A=LW**) * Record all necessary data on the handout to use later in the lesson.   **Hands-on/Minds-on Activities**  1. Making different geometric (2-D) shapes on the geoboard; determining measurement attributes of each.  2. Data collection of measurement attributes (e.g., length, width) for different shapes.  3. Determining patterns that appear in the data from the entire group.  4. Drawing conjectures about the observed patterns in the data that relate to the measurement formulas.  **Big-Idea Questions include:**  1. Where do the perimeter & area formulas come from?  2. How do the formulas of perimeter and area relate to each other? |
| **EXPLANATION**  **Questions:**  1. Why are these formulas significant to know?  2. When/where can these formulas be applied in real-life settings?  3. List real-life examples in which perimeter formulas may be applied.  4. List real-life examples in which area formulas may be applied.  5. How might you/family use these formulas on a daily basis? |
| **ELABORATION**   * Show BrainPop video, “Geometry: That’s One Way to Measure Space.” * Have participants choose an object at home which he/she will apply one of the formulas. * Reflect on all the different aspects of the formula and explain your findings to a partner. |
| **EVALUATION**   * Handout of practice exercises * Debrief/Reflection on all tasks, On-going discussions |